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UNCLASSIFIED OPERATING SPECIFICATIONS FOR THE 241-AN, AP, AW, AY, AZ & SY TANK FARMS

Tank Farm Plant Engineering

The original signatures are on file.

PCA Incorporated: TF-96-094

Procedure Signatures for OSD-T-151-00007 H-18

USQ Screening Number TF-96-897

PCA TYPE OF CHANGE

SQ REVIEW DESIGNATOR

POSITION/ORG	DELEGATE	DATE
Quality Support	W.L. Adams	11/12/96
Prin. Eng/TWRS	M. Omar Jaka	10/31.96
Shift Mgr/ETFO	R.P. Raven	11/4/96
Shift Mgr/WTFO	R. Malhan	11/12/96
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Cog Eng/ETPF	T.M. Blaak	10/3/96
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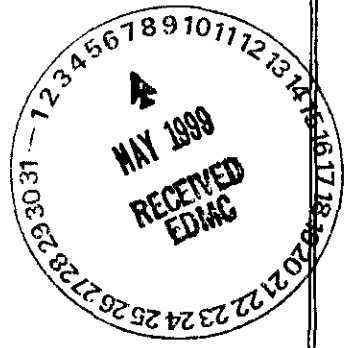

Pages Affected	Reason for Change	Summary of Change
Page 5 Section 7.2.1.A	Studies at PNNL have indicated that excessive corrosion rates occur in waste that exceeds this range. See Sludge Washing Materials Study: "The Behavior of Carbon Steel in a Dilute Waste Environment", TWRS-PP-94, dated 1994.	Added an additional specification to corrosion control criteria for waste [NO3-] < 1.0M. New specification: [NO3-]/([OH-]+[NO2-]) < 2.5.
Page 5, Section 7.2.1.C	The exemption is no longer applicable. The specified TGF feed tanks no longer store or receive the exempt waste.	This section was deleted.
Page 6	The feed tank information is no longer applicable. PNNL reference is necessary to provide basis for additional specification.	TFG feed tank information is no longer applicable. PNNL reference is necessary to provide basis for additional specification.

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7.1 INTRODUCTION

Operating specifications are limits and controls imposed upon a process or operation which, if violated, could jeopardize the safety of personnel; and could damage equipment, facilities, the environment, or adversely affect product quality.

The operating specifications in this section cover all processing and storage operations for the 241-AN, AP, AW, and SY Tank Farms. Tanks in 241-AY and AZ (aging-waste operations) are included under these operating specifications, and in OSD-T-151-00017.

The detailed requirements and authority for preparing, reviewing, releasing, and revising operating specifications are covered in GA-3.7, of WHC-CM-5-5, "Operations - General Administration."

Violations of specifications shall be reported immediately to the manager of Tank Farm Operations (TFO) by the responsible supervisor, and to managers of Process Engineering and Quality Engineering by Criticality Engineering and Analysis if a specification dealing with criticality is violated. Actions shall be taken per Accident Prevention Standard (APS #32) and WHC-MRP-5.14 for reporting and documentation.

Sections 7.1 and 7.2 describe the specification limits to be used for the safe and efficient operation of the 241-AN, AP, AW, AY, AZ, and SY underground storage tanks. Equipment directly involved with this section is referenced in the engineering drawing index for each project. The AW Tank Farm Drawing index is found in Drawing H-2-70300, the AN Tank Farm drawing index is found in Drawing H-2-71900, the AP Tank Farm drawing index is found in Drawing H-2-90435, the AY Tank Farm drawing index is found in Drawing H-2-64300, the AZ Tank Farm drawing index is found in Drawing H-2-68400, and the SY Tank Farm drawing index is found in Drawing H-2-37700. The specification limits in this section are set to prevent excessive corrosion and minimize structural stresses that the tanks and associated facilities are subjected to during operation. Also included are limits that restrict gaseous discharges to the environment.

Copies of all basis letters are found in SD-RE-TI-008, SD-WM-TI-047, SD-WM-TI-150, SD-RE-TI-041 and SD-RE-TI-064, which are available from the Engineering Document Control Group. Copies of manuals and other documents referenced as bases are available from Operating Document Control.

NOTE: In some sections no basis letters or retrievable documentation exists, therefore, specification limits for one or more farms not specifically listed is assumed valid. The basis for the specific assumption is developed in the "Basis for Limit" section.

7.2 UNDERGROUND STORAGE TANKS SPECIFICATION

7.2.1 TANK COMPOSITION

7.2.1.A Temperatures (T≤212°F)

Variable	Specification Limit
For $[NO_3^-] \leq 1.0M$:	
$[OH^-]$	$0.010M \leq [OH^-] \leq 5.0M$
$[NO_2^-]$	$0.011M \leq [NO_2^-] \leq 5.5M$
$[NO_3^-] + [OH^-] + 2[NO_2^-]$	~~≤ 6.5~~

(for solutions below 167°F, the $[OH^-]$ limit is 8.0M)

For $1.0M < [NO_3^-] \leq 3.0M$:

$[OH^-]$	0.1 ($[NO_3^-]$ ~~Concentration~~) $\leq [OH^-] < 10M$
$[OH^-] + [NO_2^-]$	≥ 0.4 ($[NO_3^-]$ ~~Concentration~~)

For $[NO_3^-] > 3.0M$:

$[OH^-]$	$0.3M \leq [OH^-] < 10M$
$[OH^-] + [NO_2^-]$	$\geq 1.2M$
$[NO_3^-]$	$\leq 5.5M$

7.2.1.B For High Operating Temperatures (T>212°F for AY and AZ tanks) - section 7.2.1.A temperature limits apply with the exception that OH^- concentration must be <4M.

~~7.2.1.C For Tanks 102 AP, 104 AP and 106 AP the following limits may apply:~~

~~Nitrite (NO_2^-) $NO_2^- < 0.005M$~~
~~Hydroxide (OH^-) $0.001M < OH^- < 0.02M$~~

~~providing the following conditions are met:~~

~~1) Only "Hanford Facility Wastes" (phosphate and/or sulfate decontamination wastes) may be added to the tanks.~~
~~2) All liquid added to the tanks must be <0.005M NO_2^-~~
~~3) Temperature < 122°F~~

~~If these conditions aren't met, the requirements of 7.2.1.A apply.~~

7.2.1 TANK COMPOSITION (Cont.)

Basis for Limit: See SD-WM-TI-150, "Technical Basis for Waste Tank Corrosion Specification," and ~~TWRS-PRTP-025, "Sludge Washing Materials Study: The Behavior of Carbon Steel in a Dilute Waste Environment," SD-RE-TI-008, Pg. 75, "AP Tank Farm Corrosion Specifications," for the TCF feed Tanks.~~ The nitrite, nitrate, and hydroxide concentrations are limited in order to inhibit uniform corrosion rates and stress corrosion cracking (SCC). If these phenomena are not controlled, deterioration of the primary tank will occur at a faster rate. Failure of these systems may occur under conditions that are out of specifications. ~~The TCF feed tanks require lower limits because they are temporary storage for materials that must meet dangerous waste regulations under Washington Administration code 173-303, these specifications can only apply to HFW phosphate and sulfate wastes.~~

Detection/Control: The tank contents must comply with the given composition limits. Tank inputs will be controlled so that the tank contents comply with the composition limits. Verification of compliance with composition limits is not necessary for transfers from catch tanks containing waste previously in or verified to comply with double shell tank composition limits, or condensate from double shell tanks. For all other transfers, it shall be verified that the composition limits in the receiving tank will not be exceeded prior to transferring additional waste into a tank.

Recovery Action: Stop all transfers associated with the affected tank. If the tank content concentrations are violated, the shift manager shall contact the manager of TFO and Tank Farm Plant Engineering (TFPE). Make notifications per WHC-IP-0842, Volume II, Sections 5.10. Recovery actions will include adjusting the concentrations to inhibit uniform corrosion rates and stress corrosion cracking.

7.2.1.D Organic Material

Variable	Specification Limit
1) Organic Material* (except lube oil)	Above 165°F, no separable organic phase Below 165°F, PUREX separable organic phase allowed
2) Max. Total Organic Carbon (TOC)	3 wt% (dry basis)

* These specifications pertain to characterized PUREX waste which may contain tributyl phosphate (TBP) and/or normal paraffin hydrocarbon (NPH) in a separable organic phase. Other separable organic waste streams shall require complete characterization prior to incorporation into the specification.

Basis for Limit: If separable organics are allowed into the underground tanks where tank temperatures are above 165°F, organic vapors or distillates can accumulate in the tanks themselves, or in the overhead system or the condensate collection tank. An organic liquid fire or vapor explosion could result from the accumulations. The TOC limit is established to identify tanks that have a higher risk of propagating organic reactions.

Detection/Control: Sampling or knowledge of feed composition and temperature is required. If organic is introduced or detected in a tank, the temperature shall be maintained below 165°F. This can be assured by not shipping any waste stream which can potentially raise the liquid surface temperature above 165°F.

For 102-AW, if a separable organic phase is detected, the tank liquid level shall be maintained at least 36 in. above the pump suction level (SD-RE-TI-008, Pg. 79) and the temperature will be maintained below 165°F. Administrative controls will be in place which will not allow any PUREX waste to be received into 102-AW when the liquid level is below 36 in. and the evaporator is running.

Recovery Action: If this requirement is violated, all waste transfers to the affected tank shall be immediately terminated. The shift manager shall notify the manager of TFO and TFPE. Make notifications per WHC-IP-0842, Volume II, Sections 5.10.

The presence of moisture provides a mitigating factor against propagating reactions in fuel-rich tanks. The combination of high fuel (high fuel concentration, organic material, organic salts or ferrocyanide) with low moisture will require the determination of appropriate mitigating actions. All DSTs are anticipated to have sufficient excess moisture to preclude the reaction hazard.

7.2.2 LIQUID LEVELS

Variable	Tanks	Specification Limit
a. Primary Tank Liquid Level***	AN, AP, AW and SY	Min: 6 in.**
	AY, AZ	Min: 64 in.*

* When the annulus ventilation system is operating. When the annulus ventilation system is not operating, the absolute minimum liquid level required is that level necessary to meet the hydrostatic head limitation discussed in OSD-T-151-00017 Para. 17.2.1.1.

** The ventilation system shall not be operated unless the liquid level is 6 in. Limiting Condition of Operation (LCO).

*** Liquid level is defined as the surface level irrespective of the amounts of sludge, supernate or solids/crust.

Basis for Limit: See HW-39432 and HW-81666 for minimum liquid levels. A minimum liquid level is set to provide extra protection against any bottom uplifting of the tank's steel liner.

Detection/Control: Each tank is provided with an automatic liquid level measuring device and/or manual tape. The reading is transmitted to a substation and then to the CASS Control Room in the 2750-E Building, or recorded on data sheets. In addition, some tanks are provided with a high level alarm probe.

A manual liquid level tape/zip cord reading may be taken at each tank as a backup to the automatic liquid level gauge. Like the automatic liquid level gauge, the manual liquid level tape measures liquid level through conductivity.

OSR Recovery Action: If the LCO is violated, the manager of TFO, TFPE and DWS shall be notified. Recovery actions include the addition of water and waste and/or manipulation of the primary exhaust system. If a surveillance requirement is violated, management shall take immediate corrective action to resolve the failure to perform the surveillance requirements.

7.2.2 LIQUID LEVELS (Cont.)

Variable	Tanks	Specification Limit
b. Leak Detection Pit Liquid Level	AN and AW	≤66 in.
	AZ and SY	≤74 in.
	AY	≤79 in.
	AP	≤55 in.
c. Encasement Leak Detection Pit Liquid Level	AY & AZ	≤408 in.

A level exceeding the specification will allow liquid to back into the drain slots in the structural slab. Flooding of the structural slab could cause a hydrostatic uplift pressure on the primary and secondary steel tank bottoms and therefore cause structural stress to the tank liners. The detection of a radioactive material leak at a liquid level above the specification would take a longer time because the material would not readily drain to the leak detection pit where radiation detection instrumentation is located.

Basis for Limit: The leak detection pit liquid level corresponds to the bottom elevation of the drainage slots in the concrete foundation. See (SD-RE-TI-008, Pg. 18) for AW and AN tanks. See (SD-RE-TI-008, Pg. 28) for AY, AZ, and SY tanks. See (SD-RE-TI-008, Pg. 13) for AP Tanks.

In the encasement leak detection pits, a level exceeding the specification will cause liquid to flow into the side-fill transfer line encasements (see drawings H-2-64317, H-2-64428, H-2-67248 and H-2-68366). The detection of a leak of radioactive material could be delayed, since the material will not drain into the leak detection pit where the radiation monitoring equipment is located.

Detection/Control: Dip tubes are used to monitor the liquid level in the leak detection pit. The weight factor transmitter activates an alarm at the respective tank farm's instrument building if the liquid level exceeds a predetermined level. This level is 36 in. for AN, AP, and AW tank farms, 30 in. for AY and AZ tank farms, and 25 in. for SY tank farm.

Recovery Action: Recovery from a liquid level above the specification maximum requires reducing the liquid level by transferring a portion of the waste to a waste storage tank.

7.2.3 HYDROSTATIC HEAD

Variable	Tanks	Specification Limit
Minimum Hydrostatic Head	AY and AZ	0 in. WG

Basis for Limit: See SD-RE-TI-008, SD-RE-TI-041 and SD-RE-TI-064 for hydrostatic head specification limits. The minimum hydrostatic head is limited to prevent high stress to and possible uplifting of the tank bottom, jeopardizing tank integrity.

For surveillance and audit requirements associated with the minimum specification limit, see SD-HS-SAR-010, OSR 11.4.

Detection/Control: Each tank is provided with liquid level measurement equipment. Minimum hydrostatic head is conservatively obtained by adding the primary tank vapor space pressure and the liquid level. Tank pressure strip charts are maintained by TFPE.

Recovery Action: If this requirement is violated, all transfers from the affected tank shall be terminated. Hydrostatic head below the minimum shall be increased by manipulation of the ventilation system and/or the addition of water or waste. For surveillance and audit requirements associated with the minimum specification limit, see SD-HS-SAR-010, OSR 11.4.

If the LCO requirement is violated, the shift manager shall contact the managers of TFO, TFPE and Safety.

7.2.4 DOME LOADING

Variable	Tanks	Specification Limit
a. Soil Cover	AN, AP, AW, AY, AZ	≤7 ft above tank dome crown*
	SY	≤6.5 ft above tank dome crown

* A limit of 7.3 ft has been set for 102-AZ.

Basis for Limit: See (SD-RE-TI-008, Pg. 38) for AN and AW tanks. See (SD-RE-TI-008, Pg. 31) for SY tanks, and letter, February 2, 1976, R. C. Roal to D. G. Harlow, "241-AY and 241-AZ Tank Dome Limits," for AY and AZ tanks. It should be noted that although the AY and AZ tanks were originally analyzed for soil cover of 6.5 ft, analyses on tanks of similar design (AW and AN) have shown that additional soil cover of .5 ft will not cause any problems. See (SD-RE-TI-008, Pg. 13) for AP Tanks.

7 2.5 VAPOR SPACE PRESSURE

Variable

See Table 7.2.5 for control variables.

TABLE 7.2.5 VAPOR SPACE PRESSURE	Page 1
	See WHC-SD-WM-SAR-016 (AN,AP,AW,SY) and WHC-HS-SAR-010 (AY, AZ) operability and surveillance requirements.

TABLE 7.2.5 VAPOR SPACE PRESSURE (Cont.)		Page 2
a. Time of tank pressurization		
OSR	11.6 Tank Farm pressurization (per farm) shall be limited to a cumulative total of 40 h during the most recent 12 month period.	
OSD	a. Maximum cumulative total for 12 month period: 40 h (per farm). b. Tank pressures continuously recorded on strip charts and reviewed quarterly.	

TABLE 7.2.5 VAPOR SPACE PRESSURE (Cont.)		Page 3
		If no way to continuously verify tank pressure, total elapsed time for non-availability shall be added to the cumulative time for the 12 month period. Charts not available: 1. Review operating logs and CASS reports for documentation of alarms on/off. 2. Review daily data sheets for observed pressure and level changes.

7.2.6 SOLUTION TEMPERATURES FOR AN, AP, AW, AY, AZ AND SY TANKS

Variable	Specification Limit
a. Maximum Temperature of Waste in Tanks	

See WHC-SD-WM-SAR-016 (AN,AP,AW,SY) or WHC-SD-HS-SAR-010 (AY,AZ), Chapter 11, implemented IOSR 3.2.2 for waste temperature limits.

b. Temperature Changeover Time for Solution in	<125°F:	≤10°F/hr*
	≥125°F:	≤20°F/day*

* Average bulk temperature. These temperature constraints are not applicable during initial tank filling (see SD-RE-TI-008, Pg. 54 and 55).

c. Temperature Gradients of Solution in Tanks	
1) Solution	≤55°F/ft
2) Solution/Vapor Interface	≤55°F/ft

Basis for Limit: See SD-RE-TI-008, Pg. 18 for AW Tanks, Pg. 29 for AN Tanks, Pg. 13 for AP Tanks, and OSD-T-151-00017. Waste temperatures are limited to prevent excessive stress to the primary tank and structural degradation of the concrete shell. High temperatures, rapid temperature cycling and extreme temperature gradients can cause concrete deterioration and cracking.

Detection/Control: Thermocouple trees are located in the AP, SY, AW, and AN primary tanks. Liquid, vapor, and solid temperatures can be read in the Tank Farms Instrument Building by use of a potentiometer. Selected thermocouple readouts are located in the 242-A Evaporator for AW and AN tanks, and in the 242-S Evaporator for SY tanks. AP tank temperatures are monitored by the microprocessor in the 271-AP Instrument Building. Tanks AY and AZ also have thermocouple probes (Refer to OSD-T-151-00017 for requirements when AY or AZ tanks contain aging waste. The requirements of this section apply otherwise). During transfers, tank temperatures are monitored closely to avoid violating the specifications.

Recovery Action: Control of high waste temperatures may involve the manipulation of the ventilation system, and/or addition of dilution.

7.2 OPERATING SPECIFICATIONS (cont.)

7.2.7 CONCRETE TEMPERATURE

Variable	Specification Limit
a. Temperature Change	< 125°F: ≤ 10°F/hr ≥ 125°F: ≤ 20°F/day
b. Temperature Gradient	≤ 35°F/ft ≤ 18°F/ft (AY & AZ)

NOTE: The vermiculite insulating concrete, which is considered a castable refractory, is exempt from concrete temperature limits.

Basis for Limit: See SD-RE-TI-008, Pgs. 7 and 78 for AN, AW and AY Tank basis. For AP Tank basis, see SD-RE-TI-008, Pg. 13, and for SY Tank basis, see SD-RE-TI-008, Pg. 31. Concrete temperatures are limited to prevent structural degradation of the concrete. High temperatures, rapid temperature cycling, and extreme temperature gradients can cause concrete deterioration and cracking.

Detection/Control: Thermocouples are located as pairs in the concrete dome and walls, and spaced singly in series in the concrete foundation and the insulating concrete, except for AY and AZ (see OSD-T-151-00017 for requirements when AY or AZ tanks contain aging waste. The requirements of this section apply otherwise). They can be read using a potentiometer in each of the Tank Farm Instrument Buildings.

Recovery Action: Concrete temperatures in violation of the specification limits may be controlled by manipulating the temperature of the stored wastes. Manipulation of the stored waste temperature may involve operation or shutdown of the steam coil in AY and AZ only, addition of dilution, and/or manipulation of the ventilation system.

7.2 OPERATING SPECIFICATIONS (Cont.)

7.2.8 HEAT GENERATION RATE

Variable	Specification Limit*
1) Maximum Heat Generation Rate AW.	70,000 BTU/hr, for 241-AN, AP and 50,000 BTU/hr, for 241-SY.
2) Max. Concentration Cesium-137 (Cs-137)	5.74×10^5 μCi/L for 241-AN, AP, and AW. 4.10×10^5 μCi/L for 241-SY.
3) Max. Concentration Stontium-90 (Sr-90)	4.04×10^5 μCi/L for 241-AN, AP, and AW. 2.88×10^5 μCi/L for 241-SY

Basis for Limit: See SD-RE-TI-008, Pg. 42 for AN and AW; For AP, see SD-340-FDC-001; for SY see ARH-2930; and for AY and AZ see OSD-T-151-00017.

The heat generation rate in the tank is limited to prevent localized boiling from occurring. The ventilating systems for AN, AP, AW, and SY were not designed for boiling, and internal boiling could cause a release of contamination. The heat content limit for the 241-SY-Farm is based on its design criteria which is more restrictive than the point at which internal boiling occurs. Ventilation systems for AY and AZ farm are designed for boiling; OSD-T-151-00017, defines the limits for AY and AZ.

The heat load was translated to Cs-137 and Sr-90 concentrations assuming that the tank holds one million gallons, and Cs-137 and Sr-90 is at 50 percent of the heat load limit. The heat load was then converted to μCi/liter using the Radionuclide Specific Activity and Heat Generation Chart (Wilkins 1984)

Detection/Control: It shall be verified that the heat generation rate limit in the receiving tank will not be exceeded prior to transferring additional waste into a tank.

Recovery Action: If this requirement is violated, all waste transfers into the affected tank shall be terminated. Waste heat generation rate in excess of the specification limit shall be reduced by transferring a portion of the waste to another tank. If necessary, waste volume may be maintained by the addition of dilution.
* Limit applies to the heat generation rate from radionuclide decay.

Make notifications per WHC-IP-0842, Volume II, Section 5.10.

7.2 OPERATING SPECIFICATION (Cont.)

7.2.9 PRIMARY TANK LEAK DETECTION FOR AN, AP, AW, AY, AZ, AND SY FARMS

Variable	Specification Limit
Operable Primary Tank Leak Detection Devices	Minimum: one operable Leak Detection device in the annulus of each tank.

Basis for Limit: Routine assessment of the integrity of the containment is required to comply with U.S. Department of Energy Order 5820.2. Leak detection in the annulus is necessary so that corrective action can be initiated if a primary waste tank develops a leak. Each annulus contains at least one conductivity probe leak detector and one annulus exhaust CAM.

Detection/Control: Leak detection devices include the annulus CAMs and conductivity probe leak detectors. The annulus CAMs and associated alarms are tested monthly, and leak detector and associated alarms are tested quarterly. Records of leak detector functional tests are maintained by Tank Farm Maintenance. Leak detectors are designed to alarm in the failed mode at a manned facility. Radiation Alarm set points are determined by WHC-CM-7-5. The annulus monitoring system is scanned by CASS. Alarms are displayed in the 242-A and 242-S Evaporators. Alarms for AY and AZ are displayed in 271-A.

OSR Recovery Action: If the requirement is violated, the manager of TFO, TFPE, and Safety shall be notified. Transfers shall not occur if leak detection capability cannot be provided and shall be terminated if lost. Recovery action shall include the use of temporary leak detection devices. Restoration of permanent leak detection systems shall be on a priority basis.

7.2.10 TRANSFER LEAK DETECTION

Variable	Specification Limit
Transfer System Leak Detection	Transfer system leak detectors shall be verified as operable (not failed) before a transfer is initiated, or applicable diversion boxes/catch tanks shall be constantly surveyed with portable conductivity probes during the transfer.

Basis for Limit: Immediate detection of liquid which has leaked from primary piping to encasements, pits, or diversion boxes allows corrective action to be taken promptly to minimize the risk of discharge of contaminants to the environment.

Detection/Control: Leak detector alarms and annunciators are tested as per Instrument Calibration Documents. Standard Operating Procedures require verification that the leak detector alarms are not active and that relays are not jumpered out prior to transfers (this is considered part of transfer route verification). Constant surveillance shall be provided if leak detectors are inoperable. Leak detectors are "Fail Safe" in that they are designed to alarm if there is a system failure.

OSR Recovery Action: If the requirement is violated, the manager of TFO, TFPE, and Safety shall be notified. Transfers will be canceled if leak detection capability cannot be provided, and shall be terminated if lost. Recovery action may include the use of temporary leak detection devices. Restoration of a permanent leak detector shall be completed on a priority basis.

7.2.11 CRITICALITY

The criticality prevention specification for DSTs and associated tanks are contained in CPS-T-149-00010. The following limits are identified to indicate that the tank is within the criticality prevention specifications.

Variable	Specification Limit
1) Maximum Pu density after in-tank concentration	1 g/L (41 μCi/g) in solids
2) Min. Solids/Pu mass ratio (Solids are any non-fissile material)	5,000
3) Minimum pH	8.0

Basis for the Limit: The variables and limits given above are from the Criticality Prevention Specification (CPS-T-149-00010). The Pu density was coverted to μCi/g assuming that all Pu was Pu-239 and the density of solids were assumed to be 1200g/L. The pH value is specified to maintain all Pu as a precipitated solid. For criticality safety pH is a secondary control. A low pH cannot by itself cause criticality.

Detection/Control: Waste samples are analyzed per the appropriate sample analysis plan (SAP).

Recovery actions: Stop ALL on-going work in affected tank. Contact on-call Manager. Do not release ANY further work packages associated with this tank until the proper tank controls are evaluated and implemented.

Make notifications per WHC-IP 0842, Volume II, Section 5.10 and notify Criticality Safety Representative.

This specification is an actual level that triggers an evaluation by Engineering. Based on the results of this evaluation, Operations will determine the Occurrence Reporting requirements per DOE ORDER 5000.3B.

7.2.12 TOTAL FUEL CONCENTRATION

Variable	Specification Limit
Max. Total Fuel Concentration (Energetics)	480 joules/g

Basis for the Limit: The above limit is found in several documents: Ferrocyanide DQO (Meacham 1995), *Ferrocyanide Safety Program Safety Criteria for Ferrocyanide Watch List Tanks* (Postma et al. 1994), Tank Safety Screening DQO (Hunt 1995), Organic DQO (Buckley 1995), and the Crust Burn/Flammable Gas DQO (Johnson 1994).

Exceeding the total fuel content indicates that the tank may meet the criteria for the ferrocyanide, organic or flammable gas Watch List. Waste which exceeds the total fuel concentration value could sustain propagating chemical reactions at elevated temperatures, reduced moisture levels and/or the presence of initiating events (spark sources).

Detection/Control: Waste samples are analyzed per the appropriate sample analysis plan (SAP).

Recovery Action: Stop ALL on-going work in affected tank. Contact on-call Manager. Do not release ANY further work packages associated with this tank until the proper tank controls are evaluated and implemented.

Make notifications per WHC-IP 0842, Volume II, Section 5.10.

This specification is an actual level that triggers an evaluation by Engineering. Based on the results of this evaluation, Operations will determine the Occurrence Reporting requirements per DOE ORDER 5000.3B.

7.2.13 FERROCYANIDE

Variable	Specification Limit
Max. Total Cyanide (Energetics)	3.9 wt%

Technical Basis: The ferrocyanide (FeCN) limits are found in, *Ferrocyanide Safety Program Safety Criteria for Ferrocyanide Watch List Tanks* (Postma 1994), and The Ferrocyanide DQO (Meacham 1995).

If this limit is exceeded that tank could be a candidate for the FeCN Watch List. A propagating chemical reaction could occur with sufficient concentrations of ferrocyanide, elevated temperatures and low moisture levels. Further analysis will be done by the Waste Tank Safety Program to determine if the tank meets the Watch List Criteria. DSTs are not anticipated to have ferrocyanide levels approaching this limit.

Detection/Control: Waste samples are analyzed per the appropriate sample analysis plan (SAP).

Recovery Action: Stop ALL on-going work in affected tank. Contact on-call Manager. Do not release ANY further work packages associated with this tank until the proper tank controls are evaluated and implemented.

Make notifications per WHC-IP 0842, Volume II, Section 5.10.

This specification is an actual level that triggers an evaluation by Engineering. Based on the results of this evaluation, Operations will determine the Occurrence Reporting requirements per DOE ORDER 5000.3B.

7.2.14 TOXIC VAPOR

Variable	Specification Limit
Compounds with toxicological properties	Level designated by NIOSH as immediately dangerous to life or health (IDLH)

Below is a list of the most common vapors that are most likely to be present in the Tank Farms. The complete list is not limited to those below.

Vapor	IDLH (ppm)
n-butanol	1,400
ammonia	300
nitric oxide	100
nitrogen dioxide	20

Technical Basis: Vapor concentrations which exceed the limit could result in concentrations that are harmful to workers near the tank.

These IDLH levels are defined to protect workers from exposure to toxic vapors. The IDLH levels for common chemicals can be found in the NIOSH (National Institute of Occupational Safety and Health) Pocket Guide to Chemical Hazards, DHHS (Department of Health and Human Services) Publication Number 94-116.

Detection/Control: Sampling is performed per the Tank Farm Health and Safety Plan (WHC-SD-WM-HSP-002, latest revision) prior to performing work in tanks. Additionally, headspace characterization samples are taken per Standard Operating Procedure.

Recovery Action: Stop ALL on-going work in affected tanks. Contact on-call Industrial Hygienist from TWRS Industrial Hygiene. Do not release ANY further work packages associated with this tank until the protective magnitude of the risk is determined and the appropriate equipment is provided by Industrial Hygiene.

Make notifications per WHC-IP 0842, Volume II, Section 5.10.

This specification is an actual level that triggers an evaluation by Engineering. Based on the results of this evaluation, Operations will determine the Occurrence Reporting requirements per DOE ORDER 5000.3B.

7.3 VENTILATION SYSTEM - INTRODUCTION

This section describes the specification limits to be used for safe and efficient operation of the 241-AN, AP, AW, and SY ventilation systems. Equipment directly involved with this section is referenced in engineering drawings which are catalogued under HVAC (Heating, Ventilation, and Air Conditioning) in the drawing index for each tank farm: H-2-70300 for AW farm H-2-71900 for AN farm, H-2-90514 for AP Farm, and H-2-37700 for SY farm.

The ventilation system for the AW, AN, AP, and SY tank farms consists of "K1" and "K2" subsystems. The "K2" subsystem is used to ventilate the annuli for each tank. The "K1" ventilation subsystem is used to cool the primary tank and to minimize radioactive vapor releases from the primary tank to the atmosphere by keeping a vacuum on the tank. In SY tank farm, the tanks will be ventilated by the "VTP-EF-3102" system with the "K1-4-1" system as the backup and a portable exhauster (P-28) available. The "K2" ventilation subsystem is used as a means of cooling the storage material and thus keeping the primary and secondary tanks within temperature specification limits. Of prime consideration is regulation of the concrete temperature in each tank.

For AY and AZ tanks, the primary tank vapor space is ventilated by the 702-A system, which is covered in OSD-T-151-00016. The AY and AZ annulus ventilation systems are also covered by that specification.

7.3.1 GENERAL REQUIREMENTS

Variable	Specification Limit
7.3.1.A HEPA Filters	
1) Pressure Drop Across Filters at Rated Flow	
a) Pressure drop across first filter in a series	≤5.9 in. WG
b) Pressure drop across any other filter	≤4.0 in. WG
c) Total pressure drop across filters in a series	≤5.9 in. WG

Basis for Limit: See SD-RE-TI-008, Pg. 44 and WHC-CM-7-5 for detailed basis. HEPA filters will fail if the pressure drop across them becomes t great. The specification limits are well below the design limits of 10 i wg pressure drop.

7.3.1 GENERAL REQUIREMENTS (Cont.)

Detection/Control: Calibrated differential pressure gauges are used for each filter to monitor the pressure drop. The gauges are checked per Standard Operating Procedures (SOPs) TO-060-105 and TO-060-104 for AW Far TO-060-101 for AN Farm, TO-060-340, TO-060-341 for AP Farm, TO-060-230, a TO-060-240 for SY Farm. Gauges are read daily. Data sheets are maintain by TFPE.

Recovery Action: If the pressure drop across a filter or across filters in a series should exceed the specification limits, it shall be taken out of service and replaced. If the total pressure drop across a series filter assembly should exceed 10 in. wg, response shall be in accordance with WHC-MRP-5.14.

	Variable	Specification Limit
7.3.1.B	Air Inlet Temperature to HEPA Filter	≤230°F

Basis for Limit: The manufacturer gives the maximum operating temperature as 250°F. See SD-RE-TI-008, Pg. 44. The 230°F specification limit was chosen to provide an increased safety margin. Excessive temperatures in the air stream will cause weakening of the filter gaskets and lead to filter failure. If a failure occurs, equipment may become contaminated and radionuclides may be released to the atmosphere in quantities above the DCG-Public exposure limits (WHC-WM-7-5).

Detection/Control: Temperature controllers located at the air heaters of the HVAC system provide regulated air temperatures. Temperature indicators are calibrated as stated in CBRS and checked to determine the operating condition of the heater per applicable procedures, work plans, work packages or other documentation.

Recovery Action: If these requirements are violated, waste transfers shall be immediately terminated, and the shift manager shall notify the manager of TFO, and TFPE.

If a failure occurs during a normal operation to the primary system, the fans shall be switched over to the standby system.

Variable	Specification Limit
7.3.1.C Filter Efficiency	
1) Single HEPA Filter System	99.95% of particles between 0.1 μm and 3.0 μm, and of average size 0.5 μm, are removed per filter.
2) Multiple HEPA Filter System	99.95% of particles between 0.1 μm and 3.0 μm, and of average size 0.5 μm, are removed per filter.

Basis for Limit: HEPA filters are to have the removal efficiencies stated above in accordance with WHC-CM-7-5. Filters not removing the specified percentage of particles may release radionuclides in excess of DCG-Public Exposure limits (WHC-CM-7-5) and constitute an occupational hazard.

Detection/Control: Filters are aerosol tested to meet the above requirements. AP, AW, AN, AY, AZ and SY Farm radiation alarms are activated at the Tank Farm's Instrument Building and the Evaporator if a radionuclide release occurs. The alarm system is interlocked to shut down the HVAC system.

Recovery Action: If a failure occurs during normal operation in any one of the HEPA filters, the HVAC system shall be switched over to the spare bank. If the specification limit is violated, waste transfers shall be immediately terminated, and the shift manager shall notify the manager of TFO, and TFPE.

Variable		Specification Limit
7.3.1.E.	Gaseous Discharges from Ventilation System	Maximum permissible concentration of radionuclides
	1) Annual Average Concentrations*	Not to exceed 1 time the DCG-Public Value of WHC-CM-7-5, Appendix A, at point of release. *(see exceptions)
	2) Weekly Average Concentrations*	Not to exceed 10 times the annual average ACV concentration for that stack at point of release.*
	3) Instantaneous Concentration	Not to exceed 5,000 times the DCG-Public Value of WHC-CM-7-5, Appendix A, averaged over any four hour period at point of release.

a. Exceptions

Stacks 296-A-17, 296-A-27, 296-A-29	Not to exceed 10 times the DCG value of Appendix A at point of release.*

(For other exceptions see compliance plans to WHC-CM-7-5.)

* Except for krypton-85: Not to exceed a combined release of 4 E+06 Ci/yr.

Basis for Limit: The basis for the concentration limits is the Environmental Compliance Manual, WHC-CM-7-5, Part D, Section D5.0, and also DOE Order 5480.1B. The concentration guides are used in evaluating the adequacy of health and environmental protection measures against airborne radioactivity in occupied areas.

Detection/Control: For AW, AN, AP, and SY, the system is as follows: A Radiation Analyzer (RAN) and Effluent Record Sampler samples the air contained in the K1 and K2 Exhaust Stacks. One RAN and one Record Sampler are provided for each stack. Both the RAN unit and the Record Sampler collect particulate samples on filter paper. The sample is then analyzed to determine conformance with DCG-Public limits (Environmental Compliance Manual, WHC-CM-7-5).

Control of the HVAC System is covered by applicable procedures, work plans, work packages or other documentation.

Recovery Action: If the specification limits are violated, the shift manager shall notify the managers of TFO, TFPE and WMHP. Required monitoring and sampling shall be promptly re-established. Response to unplanned releases shall be according to WHC-ERM-001 and RHO-MA-111.

7.3.2 PRIMARY TANK VENTILATION (FOR AW, AN, AP, SY FARMS)

Variable	Specification Limit
a. Active Ventilation	In the event that active ventilation cannot be maintained, operations in the affected tank farm shall be curtailed.

Basis for Limit: Under normal operating conditions, active ventilation will be maintained for double-shell tanks. Active ventilation prevents tank vapors from escaping the tanks, and thereby releasing radionuclides to the atmosphere in excess of DCG-Public Exposure limits. Vapor releases may be caused by radiolytic heat converting water to steam, by displacement of air due to waste transfers, by natural breathing of the tank due to changes in atmospheric pressure, and by natural convection currents due to thermal gradients.

Detection/Control: If the ventilation system is shut down, annunciators will activate in those particular Instrument Buildings or Evaporator. Pressure alarms also activate in 2750-E on CASS. Data Sheets and Strip Charts are maintained by TFPE.

Recovery Action: If active ventilation cannot be immediately restored, all necessary steps as determined by Nuclear Safety and TFPE, will be taken to minimize effects, and operations in the specific farm will be curtailed. All efforts to restore ventilation shall be completed on a priority basis.

FLAMMABILITY CONTROL

The work activities in this section apply to all tanks (DSTs and SSTs).

For tanks listed in Appendix A of OSD-T-151-00030 as flammable gas Watch List tanks additional controls may be specified in the appropriate section of that OSD. For tanks listed in Appendix A of OSD-T-151-00030 as flammable gas or organic Watch List tanks, where the requirements of OSD-T-151-00030 are more restrictive than the requirements of this Operating Specification Document (OSD), the requirements of OSD-T-151-00030 shall apply.

The controls imposed in this section for flammable gas bound the controls required for organic tanks. Therefore, organic controls are not imposed or discussed separately. If control requirements are to be modified, both flammable gas and organic issues may need to be evaluated.

The terms TFTP-SO, TFTP-E, WTPE and NS used in this section refer to East/West Tank Farm Transition Project-Shift Operations, East/West Tank Farm Transition Project-Engineering, Waste Tank Process Engineering and Nuclear Safety, or the organizations currently responsible for these activities.

In the following specification limits the term "Per Flammable Gas Control Limits" means:

"1. If the flammable gas concentration is ≤ 10% of the Lower Flammability Limit (LFL), continue with work.

2. If the flammable gas concentration is > 10% of the LFL, but ≤25%:

a) Stop work
b) Notify TFTP-SO, TFTP-E, WTPE, and NS for evaluation.
c) Continue work only upon approval of a written plan describing how to proceed. The approvals needed are TFTP-SO, TFTP-E, and NS.

3. Work not permitted if flammable gas concentration >25% of the LFL."

A grab sample should be taken and sent to the lab for analysis if flammable gas concentration >25% of the LFL. See the Detection and Controls section for monitoring/sampling methods, interpretation of the term LFL, and equivalence with Standard Hydrogen Monitoring System (SHMS) readings.

7.4.1 NON-TANK INTRUSIVE WORK[1]

Control		Specification Limit	
A.	Sample tank vent system before breaking containment[4]	1)	Per Flammable Gas Control Limits
B.	Tools & Bonding	1)	Spark resistant tools[2] required for all openings >1 inch inner diameter[3] until monitoring shows <25% of the LFL inside the work space.
		2)	Electrical bonding per NFPA 77 of flange, cap, etc. to be removed is required for all openings >1 inch inner diameter[3] until monitoring shows <25% of the LFL inside the work space.
C.	Monitoring of riser or opening	1)	A nominal five minute pause required prior to performing work after flange, cap, etc. is loosened enough to allow air in-leakage.

[1] Driving vehicles, carrying electrically conductive objects, operating electrical equipment, walking on gravel, or conducting any other routine activity in the vicinity of manual tape devices, breather filters or other objects that may have an open path to the tank vapor space are permitted without sampling the tank vapor space.

Following are definitions of work classifications. Should a question arise, TFTP-E shall be the authority for determining work classification.

NON INTRUSIVE WORK: This includes all work done on parts of the tank or ventilation system which are isolated from the tank air space by dampers, butterfly valves, blanks or other means, and is not otherwise included in the definition of tank intrusive work below. There are no flammable gas controls for non intrusive work. For the purpose of the meeting the flammable gas control requirements in this OSD, adding water to a tank or flushing equipment is considered non intrusive work, providing the water is added through a dedicated line/valve, quick disconnect or similar arrangement where it is not required to breach the containment to add the water.

NON-TANK INTRUSIVE: This includes all work which is done in a vapor space which is common with the tank vapor space, but doesn't meet the definition of tank intrusive. Non-tank intrusive activities include (but are not limited to) ventilation and balance activities, some level gauge instrument repairs, work on weight factor dip tube lines which have been purged prior to disconnecting and vapor space sampling in tank ventilation headers. Non-tank intrusive work includes all activities within 10 pipe diameters of an opening to the tank vapor space that provides a direct path back inside the tank boundary, except as excluded by the first paragraph above. (Note: if a riser is within a greenhouse with a wall closer than 10 pipe diameters, the 10 pipe diameter control only applies up to the wall of the greenhouse, unless there is a direct path through the wall between the activity and the opening. For irregular shaped openings the 10 pipe diameter distance shall be estimated based upon the approximate cross sectional area of the opening.

TANK INTRUSIVE: Any activity that penetrates the plane of the riser is considered a tank intrusive activity. This includes both dome intrusive and waste intrusive activities. Tank intrusive work includes all activities that are in direct contact with the outside of the boundary, such as welding or grinding, that could result in an ignition source inside the boundary. Insertion of a gas monitoring tube into an open riser for monitoring prior to doing non-intrusive work above the plane of the riser shall not be considered tank intrusive work.

DOME SPACE INTRUSIVE: Dome space intrusive includes all work within the tank space which does not penetrate below the waste surface. Activities include (but are not limited to) such items as installing vapor probes. Activities involving equipment within the tank which do not meet the definition of waste intrusive shall be treated as dome intrusive.

WASTE INTRUSIVE: Active operations in waste intrusive work includes all work where some object is in motion under the waste surface. Activities considered waste intrusive include (but are not limited to) core sampling when the drill pipe is rotating or being inserted/removed, installing instrument trees or liquid observation wells, and the removal or installation of mixer pumps. Controls for dome intrusive activities also apply to waste intrusive activities. Work on weight factor dip tube lines which have not been purged prior to disconnecting, or any other open ended objects which are inserted below the waste surface but where there is no equipment movement below the waste are considered a form of waste intrusive work, but not active operations.

[2] Spark resistant tools are required when working around open risers or equipment within 10 pipe diameters of an opening to the tank vapor space that provides a direct path back inside the tank boundary (see exception above under non-tank intrusive work). Spark resistant tools are not required for loosening nuts/bolts, etc. for the first nominal turn or for final tightening. Where practical, spark resistant tools should be used for the remaining loosening. If use of spark resistant tools isn't practical for the remaining loosening, the use of non spark resistant tools is acceptable providing the boundary to the tank vapor space isn't breached.

[3] Spark resistant tools and electrical bonding not required for openings ≤1 inch inner diameter.

[4] Sampling within the ventilation system refers to any available port, penetration or duct opening. For work on a specific tank, if no port is available upstream of where the tank exhaust mixes with exhaust from other tanks, sampling shall be done at the tank riser or opening.

Basis: See Basis section following 7.4.3.

Detection and Controls: See Detection and Controls section following 7.4.3.

Recovery Action: See Recovery Action section following 7.4.3.

7.4.2 TANK INTRUSIVE WORK[1]

Control		Specification Limit	
A.	Sample tank vent system before breaking containment[3]	1)	Per Flammable Gas Control Limits
B.	Tools & Bonding	1)	Spark resistant tools[2] required until vapor sampling demonstrates the flammable gas concentration is <25% of the LFL inside the work space.
		2)	Electrical bonding per NFPA 77 of flange, cap, etc. to be removed is required until vapor sampling demonstrates the flammable gas concentration is <25% of the LFL inside the work space.
C.	Riser monitoring	1)	A nominal five minute pause required prior to performing work after flange, cap, etc. is loosened enough to allow air in-leakage.
D.	Dome space monitoring	1)	If dome intrusive work is to be done, a vapor sample shall be taken from ≥ three feet (nominal) below where the riser enters the dome space.
		2)	Per Flammable Gas Control Limits

E. Additional monitoring

1) For dome intrusive work only, no additional sampling is required.

2) For waste intrusive work, EXCLUDING pumping, monitor dome space and record flammable gas level every 15 minutes during active operations.

For waste intrusive work in the vapor space of open ended objects inserted below the waste surface, monitoring frequencies and/or other controls shall be specified in the controlling work documentation.

Work not permitted if FG Conc. >25% of the LFL

F. Electrical or other equipment

1) Equipment (level indicating devices such as FICs, Manual Tapes or Zip Cords are excluded, as are enclosed items such as thermocouple trees) where energized circuits can come in contact with waste degradation gases prior to dilution by the tank vapor space or other gases shall be either:

a) Qualified in accordance with NFPA for use in Class 1, Division 1, Group B for a flammable hydrogen atmosphere, or

b) Purged in accordance with the National Fire Protection Association, Inc. (NFPA), Article 496, Type X purging, to conform with the requirements of the National Electrical Code (NEC), Article 501 for use in the flammable hydrogen atmospheres.

If neither of the above can be met, continuous monitoring or administrative controls may be included in the controlling documentation for the work to achieve equivalent safety by demonstrating the atmosphere which could come in contact with the electrical equipment is <25% of the LFL during the period when the equipment is energized. These con rols must be approved by TFTP-SO, TFTP-E , and NS

2) Core sampling drill pipe shall only be rotated within the waste when using a drill bit demonstrated to not cause ignition of simulated waste gas(es) under the conditions used.

[1] See footnote (1) following 7.4.1

[2] See footnote (2) following 7.4.1

[3] See footnote (4) following 7.4.1

Basis: See Basis section following 7.4.3.

Detection and Controls: See Detection and Controls section following 7.4.3.

Recovery Action: See Recovery Action section following 7.4.3.

7.4.3. WASTE TRANSFERS

The requirements below are applied to DST waste transfers in addition to those in Section 7.2 of this Operating Specification Document (OSD).

Control		Specification Limit
A.	All waste transfers	1) All waste transfers shall be performed using procedures, work plans, work packages or other documentation which has been approved per the requirements of WHC-CM-3-5 Section 12.7, latest revision.

Basis: The controls and specification limits in sections 7.4.1-7.4.3 provide an equivalent degree of protection for non-watch list double shell tanks as those controls listed in OSD-T-151-00030 for watch list tanks. The limits and other wording are based upon equipment capabilities and objective evidence. These requirements are meant to ensure the tanks are operated in a safe and efficient fashion.

The basis for not requiring bonding or spark resistant tools, FOR NON-TANK INTRUSIVE WORK ONLY, on lines ≤1 inch inner diameter is based upon the following: Bonding is done to minimize static electrical buildup and discharge. The potential for static buildup on a screwed fitting should be less than for a flanged fitting where there is a gasket in between the flange and the riser and where electrical contact may not be adequate through the bolts. A resistance of <1 megohm (required by NFPA 77 for static bonding) between the nut and tubing is realistic for a small screwed fitting in the service seen in tank farms. Most screwed fittings will only be removed for a short period of time, which will minimize the time for static to build up on the removed fitting. For screwed fittings the chance of a wrench causing a spark against a fitting while there is an opening to the tank vapor space is negligible. This is due to the smaller diameter of the fitting, the less potental torque required vs. that for a riser bolt, and the geometry of the fitting and tubing. The selection of a 1 inch maximum was made so as to include most instrument tubing or small piping to be encountered, but to exclude gasketed flanges.

Detection and Control: The above requirements shall be included as applicable in documentation covering activities for tank intrusive work.

A Job Hazard Analysis or equivalent documentation shall be completed prior to all waste intrusive work, or; "step by step" procedure requirements stating health and safety hazards shall be included in the work package, work plan, procedure or other approved documentation.

Physical restraints shall be in place to prevent accidently dropping objects into the tank.

Prior to obtaining a vapor sample from a riser or other opening, a nominal 5 minute pause is required after the flange, cap, etc. is loosened enough to allow air inleakage. Vapor spaces should be sampled per The Tank Farm Health and Safety Plan (WHC-SD-WM-HSP-002), latest revision, (HASP) or equivalent documentation. The % LFL is normally obtained using a portable Combustible Gas Monitor (CGM). These units provide a percent LFL reading and the percent oxygen. The response of a CGM will vary with the type of flammable gas present and is dependent upon the calibration gas used (pentane). When calibrated on pentane, the CGM will read high by a factor of two for a hydrogen-air mixture (i.e.-a gas mixture which is 10% of LFL value for hydrogen will read 20% of the LFL on the CGM). This additional level of conservatism will not be taken into account when reading the CGM. If a 10% of the LFL reading is obtained on a CGM, response shall be as required by the Specification Limit.

Some tanks have Standard Hydrogen Monitoring System (SHMS) installed. These units indicate the percent (or parts per million (ppm)) hydrogen only, and do not indicate the presence of other constituents. The flammability limit for hydrogen in air is about 4.1 vol%, so 25% of the LFL for a hydrogen-air mixture would be about 1 vol% H_2, or about 10,000 ppm on a SHMS. The SHMS are set to alarm at 6,250 ppm, as other gases such as NH_3 or N_2O, for example, may be present which could lower the LFL. Although the 6,250 ppm hydrogen alarm setpoint is only about 15% of the LFL for a hydrogen-air mixture (and a CGM reading the same gas would indicate about 31% of the LFL), it is believed to be within 25% of the LFL for any conceiveable flammable waste gases. During some activities it may be more practical to use a SHMS cabinet to obtain readings instead of using a CGM. It is acceptable to monitor with a SHMS instead of with a CGM, with the following conditions:

1) the flammability reading needed is from the tank dome space or vent system which is monitored by a SHMS, not a riser.

2) a 2500 ppm H_2 indication on a SHMS may be used for the lower "alert" limit instead of a 10% of the LFL reading on a CGM.

3) a maximum 6,250 ppm H_2 indication on a SHMS (or if the SHMS alarms) may be used as the upper "stop work" limit. Although this value is the equivalent of approximately a 31% of the LFL reading on a CGM calibrated with pentane when monitoring a hydrogen-air mixture, the use of this limit is acceptable due to the factor of two conservatism in the CGM reading. If 6,250 ppm is exceeded (or the SHMS alarms), response shall be per the Specification Limit.

Where approval to continue is required for flammable gas concentrations > 10% of the LFL, the decision to continue will be determined by TFTP-SO, TFTP-E and NS personnel based upon the individual tank history, past or existing flammable gas concentration, the work to be done and the time involved. The 10% limit is not intended as a limit beyond which work should cease. It is intended to be used as a flag to notify personnel that the work involved will be in an atmosphere exceeding negligible flammable gas levels, and that the tank may need to have it's potential flammable gas status evaluated if not done previously. Monitoring for or removing potential flammable gases within open ended objects such as core sampling drill pipe, pit or vent system seal leg drains, pump suction legs, weight factor dip tubes or other items which extend below the waste surface shall be included where necessary in the procedure, work package or other controlling documentation for work involving the item. The determination of when such extra controls are necessary will be made by TFTP-E , considering such facts as how long the item has been submerged, the possibility of encountering trapped gas pockets, the rate at which flammable gases could be generated within the object or items connected to it, or the length of time since it may have last been purged. Controls should include purging, flushing or monitoring as necessary to ensure safe operations are maintained.

Recovery Action: Contact on-call Manager. Do not release any further work packages with this tank until review by TFTP-SO and TFTP-E .

SPECIFICATION BASIS DOCUMENTS

1. WHC-CM-4-3, Industrial Safety Manual, Westinghouse Hanford Company, Richland, Washington (October 1988).

2. WHC-CM-5-5, Operations - General Administration, Westinghouse Hanford Company, Richland, Washington (September 1988).

3. SD-RE-TI-008, Compilation of Basis Letters Referenced in 241-AN, AP, AW, AY, AZ, and SY Operating Specifications, Rockwell Hanford Operations, Richland, Washington.

4. T.G. Hanson, Compilation of Basis Letters Referenced in OSD-T-151-00017, SD-RE-TI-064, Rockwell Hanford Operations, Richland, Washington (December 1986).

5. J. H. L. Lawler, References to SD-WM-TI-050, SD-WM-TI-053, Rockwell Hanford Operations, Richland, Washington (December 1982).

6. DOE-RL, Radioactive Waste Management, DOE-RL Order 5820.2, U.S. Department of Energy, Richland Operations, Richland, Washington (July 1979).

7. D. J. Squires, Aging Waste Facility Safety Analysis Report, SD-HS-SAR-010, Rockwell Hanford Operations, Richland, Washington (February 1987).

8. F. R. Vollert, Thermal Creep and Ultimate Load Analyses of the 241-AY/AZ Reinforced Concrete Underground Waste Storage Tank, SD-RE-TI-041, Rockwell Hanford Operations, Richland, Washington (September 1982).

9. R. S. Pavlina, Tank Farm Sample Schedule, FSS-T-080-00001, Rockwell Hanford Operations, Richland, Washington (May 1986).

10. C. DeFigh-Price, Bibliography of Documents Related to Waste Tank Integrity, SD-WM-TI-015, Rockwell Hanford Operations, Richland, Washington (July 1982).

11. J. H. L. Lawler, Direct Neutralization Parameters for PUREX High-Level Wastes, SD-WM-TI-050, Rockwell Hanford Operations, Richland, Washington (November 1982).

12. N. W. Kirch, Technical Basis for Waste Tank Corrosion Specifications, SD-WM-TI-150, Rockwell Hanford Operations, Richland, Washington (August 1984).

13. WHC-CM-5-7, Tank Farm Surveillance & Operations Manual, Westinghouse Hanford Company, Richland, Washington (September 1988).

14. WHC-IP-0842, volume II, section 5.10, Response to Anomalous Data

APPENDIX

SAFETY BASED - SPECIFICATION TRACEABILITY MATRIX

Source	Specification	Operating Procedure	Record of Documentation
SD-WM-TI-150	7.2.1: Tank	TO-080-030	Sample Analysis, Calculations or Evaluations
SD-RE-TI-008	Composition		
(FSS-T-080-00001)	7.2.1: Organic Material	RHO-HS-SF-001	Sample Analysis
11.5 OSR: Primary Vessel Hydrostatic Head. (SD-WM-SAR-016)	7.2.2:Liquid Levels;Primary Tank Liquid Levels	TO-040-020 TO-040-180 TO-040-200	Tank Farm Liquid Level Data Sheets And Tank Farm Pressure Strip Charts
SD-RE-TI-008 SD-RE-TI-041 HW-39432 HW-81666		TO-060-340 TO-060-104 TO-060-230	
SD-RE-TI-008 SD-RE-TI-041 SD-RE-TI-064 (OSD-T-151-00017) (FSS-T-080-00001)	7.2.3:Hydrostatic Head	FSS-T-080-00001 TO-040-020 TO-040-180 TO-040-200 TO-060-100 TO-060-101 TO-060-104 TO-060-230 TO-060-340 TO-080-030	Data Sheets; Sample Analyses; Tank Farm Pressure Strip Charts
SD-RE-TI-008 SD-RE-TI-041	7.2.4:Dome Loading Live Loads	None TO-020-250 TO-020-270	None

SAFETY BASED - SPECIFICATION TRACEABILITY MATRIX (Cont.)

Source	Specification	Operating Procedure	Record of Documentation
11.6 OSR:Tank Pressurization (SD-WM-SAR-016) SD-RE-TI-008 OSD-T-151-00017	7.2.5 Tank Pressurization; Vapor Space Pressure	TO-040-020 TO-060-331 TO-200-400	Pressure Strip Charts Preventative maintenance record form
SD-RE-TI-008 SD-RE-TI-041	7.2.6:Primary Tank Temperatures	TO-200-463 TO-040-660 TO-040-680	Tank Temperature Data Sheets
SD-RE-TI-041 SD-RE-TI-008	7.2.7:Concrete Temperature	TO-040-660	Data Sheets
SD-RE-TI-008 SD-RE-TI-047	7.2.8:Heat Generation Rate	FSS-T-080-00001 TO-080-030	Sample Analyses, Calculations or Evaluations
11.4 OSR:Primary Tank Leak Detection (SD-WM-SAR-016) RHO-CD-253 RHO-CD-213 SD-RE-TI-008	7.2.9:Leak Detection -	TO-020-210 TO-020-190 TO-060-120 TO-060-140 TO-040-590 TO-200-400	Tank Farm - Liquid Level Data Sheets
11.7 OSR:Waste Transfer System Leak Detection (SD-WM-SAR-016) RHO-CD-213	7.2.10:Leak Detection; Transfer Leak Detection	TO-025-001 TO-140-010	Waste Tank Transfer Data Sheets

SAFETY BASED - SPECIFICATION TRACEABILITY MATRIX (Cont.)

Source	Specification	Operating Procedure	Record of Documentation
WHC-CM-7-5 SD-RE-TI-008	7.3.1:HEPA Filters (a)Pressure Drop Across HEPA Filters	TO-060-101 TO-060-104 TO-060-105 TO-060-230 TO-060-240 TO-060-340 TO-060-341	Procedure Data Sheets
	(b)Air Inlet Temperature to HEPA Filter		
RHO-PS-MA-3, 7-GN-46	(c)Filter Efficiency		
	(d)Temperature Change Across Air Heater		
WHC-CM-7-5, Part D DOE Order 5480.1B	(e)Gaseous Discharges from Ventilation System		
WHC-CM-7-5	7.3.2:Primary Tank Ventilation	TO-060-104 TO-060-340	Procedure Data Sheets

LIST OF OPERATING PROCEDURES BY NUMBER & DESCRIPTION

	NUMBER	DESCRIPTION
1.	TO-040-020	CASS Terminals
2.	TO-020-190	East Area Leak Detection Alarm System
3.	TO-020-210	West Area Leak Detection Alarm System
4.	TO-040-180	Operation of Auto. Liquid Level & Intrusion Gauges @ East & West Tank Farms
5.	TO-040-200	Manual Measurement of Liquid Level in Underground Waste Storage Tanks & Disposal Cribs
6.	TO-040-590	Leak Detection Wells & Annulus Leak Detection Systems
7.	TO-040-660	241-A, AN, AP, AW, AX, AY & AZ Temperature Monitoring
8.	TO-040-680	241-SY Temperature Monitoring
9.	TO-060-070	General Procedure for Changing Filters & Deentrainers in Tank Farm Exhausters
10.	TO-060-101	241-AN Vessel Vent & Annulus Vent Systems
11.	TO-060-104	241-AW Primary Tank Ventilation System
12.	TO-060-105	241-AW Annulus Ventilation System
13.	TO-060-120	Operate AY Annulus Ventilation System
14.	TO-060-130	Placing the AY/AZ Tank Annuli on the 702-A Vent System
15.	TO-060-140	Operate 241-AZ Annulus Ventilation System
16.	TO-060-150	Operate Vessel Vent System
17.	TO-025-001	Tank Farm Transfer Procedure - General
18.	TO-140-010	Leak Checking Waste Transfer Lines
19.	TO-200-463	241-AY and 241-AZ Temperature Monitoring
20.	TO-010-001	Tank Temperature Data Sheets
21.	TO-060-340	241-AP Primary Ventilation System
22.	TO-060-230	241-SY Primary Tank Ventilation System
23.	TO-060-240	241-SY Annulus Ventilation System
24.	TO-080-030	Below Liquid Surface Supernatant Sampling Procedure for Underground Storage and Catch Tanks
25.	TO-020-250	In Farm Installation of New or Modified Large Equipment Items
26.	TO-020-270	Equipment Removal or Installation at Diversion Boxes or Pits